

High-Performance Commercial Building Systems

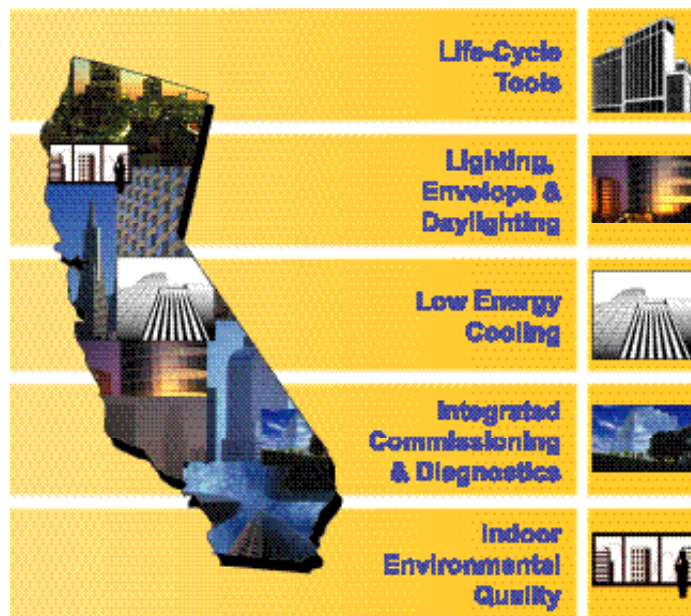
Commercial buildings account for about one-third of all California electricity consumption, at an annual cost of \$9 billion. Although aggressive efforts by California to improve building design within the state have led to significant increases in commercial building energy efficiency over the past 20 years, the savings are still well below technical and economic potential.

A new three-year public-private research initiative, which will target substantial reductions in the energy costs of commercial buildings, has been launched under the leadership of scientists from the U.S. Department of Energy's Ernest Orlando Lawrence Berkeley National Laboratory. More than \$13 million in research, development, demonstration and deployment funding has been committed by the California Energy Commission through its Public Interest Energy Research Program, along with the Department of Energy, Pacific Gas & Electric and private sector partners who will provide in-kind assistance. A team of 13 public and private sector organizations will carry out the many tasks of the program.

Program goals

Broad program goal: to develop and deploy energy saving technologies, strategies, and techniques, and to improve processes for designing, commissioning, and operating commercial buildings while improving the health, comfort and productivity of occupants. A second goal is to routinely and cost-effectively achieve energy savings levels that were previously achieved only in prior RD&D programs: 70% in new construction and 50% in major retrofits. The program is intended to strengthen the state's growing energy efficiency industry, providing jobs for companies in hardware, software, design and building service.

Specific program goal: to produce technologies and tools that will assist the commercial sector in California to reduce electricity use by 22% by the year 2015. These savings of 24,000 GWh per year would be worth \$2.4 billion per year to ratepayers and would benefit the environment by reducing carbon emissions 2,260,000 tons per year.



Research partners

Berkeley Lab, as prime contractor, has assembled a team of institutions to carry out the research, including MIT, Texas A & M, UC Berkeley, UC San Diego, PECO, and Davis Energy Group. Other partners, including PG&E, DOE, Honeywell, Silicon Energy, Ove Arup and Partners, Flack + Kurtz, and Architectural Energy Corp. will provide matching support.

Deployment partner

A unique feature of the program is the participation of PG&E in implementing market transformation activities to help deploy the products of the research and development effort through training, outreach and demonstration projects.



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Five Program Elements

The High-Performance Commercial Building Systems Program will develop new technologies and design and operations practices in five areas:

Life-Cycle Tools

Integrated building performance management systems. Includes software tools, analysis techniques, data definitions and schema (e.g. performance metrics), data schema for interoperability, and benchmark databases for evaluating commercial building energy use and other performance issues.

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Lighting, Envelope and Daylighting

Hardware and software to control and monitor conventional lighting and envelope devices for comfort and energy efficiency. Control systems operating on a low-cost building communications network, allowing for occupant-based and building-wide control of lighting and dynamic envelope elements (e.g. electrochromic glazings).

Contact: Steven Blanc, PG&E, slb4@pge.com, 925.866.5570

Low Energy Cooling

Strategies to reduce the energy consumption and peak demand associated with the cooling of commercial buildings in California climates. Novel space conditioning systems (e.g. displacement ventilation, evaporative cooling, chilled ceilings). Demonstration of proven low energy cooling technologies. New tools for design, commissioning and operation of systems.

Contact: Philip Haves, LBNL, phaves@lbl.gov, 510.486.6512

Integrated Commissioning and Diagnostics

Reliable practices for commissioning buildings to operate as designed, and for fine tuning after occupancy. Procedures for diagnosing problems that prevent buildings from operating at maximum efficiency. Case studies to facilitate commissioning as standard practice. Advanced commissioning, including supporting software and sensors.

Contact: David Claridge, Texas A&M, claridge@esl.tamu.edu, 409.834.1280

Indoor Environmental Quality

HVAC and indoor pollutant source control technologies; information that assists state agencies and utilities develop market programs for energy-efficient relocatable classrooms (RCs). Demonstration of improved indoor environments in RCs and documentation of impacts on student health and learning.

Contact: Bill Fisk, LBNL, wjfisk@lbl.gov, 510.486.5910

For more information about the program, contact:

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or visit the program website (currently under construction) at **<http://buildings.lbl.gov>**



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